What is claimed is:

1. A silver salt photothermographic dry imaging material comprising:

non-photosensitive aliphatic carboxylic acid silver salts;

a photosensitive emulsion containing photosensitive silver halide grains;

a silver ion reducing agent;

a binder; and

a cyan coloring leuco dye,

wherein a percentage of the photosensitive silver halide grains having a mean particle size of 0.01 μm or more and 0.04 μm or less is 5% or more by mass and 50% or less by mass of total photosensitive silver halide grains by conversion into a silver amount.

2. A silver salt photothermographic dry imaging material comprising:

non-photosensitive aliphatic carboxylic acid silver salts;

a photosensitive emulsion containing photosensitive silver halide grains;

a silver ion reducing agent;

a binder; and

a cyan coloring leuco dye,

wherein the non-photosensitive aliphatic carboxylic

acid silver salts are manufactured by making a silver ion-containing solution using water or a mixture of water and an organic solvent as a solvent react with an alkali metal salt of aliphatic carboxylic acid-containing solution using water, an organic solvent or a mixture of water and the organic solvent as a solvent under existence of tertiary alcohol.

3. The material of claim 1, wherein the non-photosensitive aliphatic carboxylic acid silver salts are manufactured by making a silver ion-containing solution using water or a mixture of water and an organic solvent as a solvent react with an alkali metal salt of aliphatic carboxylic acid-containing solution using water, an organic solvent or a mixture of water and the organic solvent as a solvent under existence of tertiary alcohol.

4. A silver salt photothermographic dry imaging material comprising:

non-photosensitive aliphatic carboxylic acid silver salts;

a photosensitive emulsion containing photosensitive silver halide grains;

a silver ion reducing agent;

a binder; and

a cyan coloring leuco dye,

wherein the binder contains latex of polymer with an equilibrium water content of 2% or less by mass at 25°C and at 60% RH.

5. The material of claim 1, wherein the binder contains latex of polymer with an equilibrium water content of 2% or less by mass at 25°C and at 60% RH.

6. The material of claim 2, wherein the binder contains latex of polymer with an equilibrium water content of 2% or less by mass at 25°C and at 60% RH.

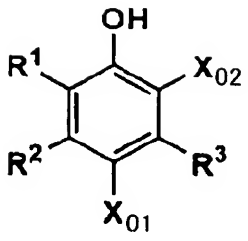
7. A silver salt photothermographic dry imaging material comprising:

a support;

a photosensitive layer containing non-photosensitive aliphatic carboxylic acid silver salts, photosensitive silver halide grains, a silver ion reducing agent and a binder, the photosensitive layer being provided on the support;

a cyan coloring leuco dye; and

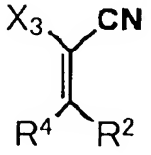
at least one compound selected from the group of compounds represented by the following Formulas (1) to (4), (A-8), (A-9), (PO) and (J),



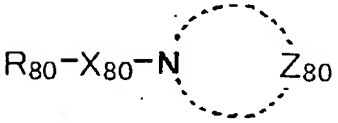
···(1)

$Z_{10}-P-L_1-(C=Q_1)-Y_1$ ····(2)

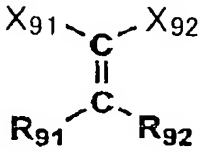
$Z_{20}-SO_2-SM_2$ ····(3)



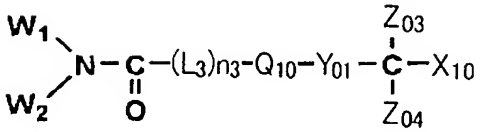
···(4)



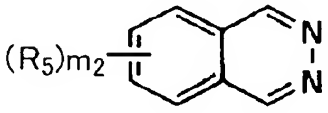
···(A-8)



···(A-9)



···(PO)



···(J)

wherein in the Formula (1), each of the X_{01} and X_{02} represents a hydrogen atom, a halogen atom, an alkyl group, a cycloalkyl group, an aryl group, a heterocyclic group, a -COOH or a salt thereof, or an aryl group or alkyl group which is bonded via a bivalent linkage group, at least one of the X_{01} and X_{02} being -COOH or a salt thereof; and each of the R^1, R^2 and R^3 represents a hydrogen atom, a halogen atom, an alkyl group, a cycloalkyl group, an alkenyl group, an aryl group, a heterocyclic group, or an aryl group or alkyl group which is bonded via a bivalent linkage group;

in the Formula (2), the P represents an oxygen atom, a sulfur atom or an NH group; the Q_1 represents an oxygen atom or a sulfur atom; the Y_1 represents an OH group, an OM_1 group, an SH group, an SM_1 group or an NH_2 group, the M_1 representing a counter ion; the L_1 represents a bivalent linkage group; and the Z_{10} represents an alkyl group, an aryl group or a heterocyclic group;

in the Formula (3), the Z_{20} represents an aliphatic hydrocarbon group, an aryl group or a heterocyclic group; and the M_2 represents a metal atom or an organic cation;

in the Formula (4), the R^4 represents a hydroxyl group or a metallic salt of the hydroxyl group; the R^5 represents an alkyl group or an aryl group; and the X_3 represents an electron withdrawing group, or the R^5 and the X_3 are capable of forming a ring including an electron withdrawing group;

in the Formula (A-8), the Z_{80} represents an atomic group required for forming a nitrogen-containing heterocycle; the X_{80} represents an SO_2 group or an OSO_2 group; and the R_{80} represents an alkyl group, an alkenyl group, an alkynyl group, an aryl group, an alkaryl group, an aralkyl group or a heterocyclic group;

in the Formula (A-9), the R_{91} represents a hydroxyl group or a metallic salt of the hydroxyl group; the R_{92} represents an alkyl group, an alkenyl group, an alkynyl group, an aryl group, an alkaryl group, an aralkyl group or a heterocyclic group; and each of the X_{91} and X_{92} represents an electron withdrawing group;

in the Formula (PO), each of the Z_{03} and Z_{04} independently represents a halogen atom; the X_{10} represents a hydrogen atom or an electron withdrawing group; the Y_{01} represents a -CO- group or an SO_2- group; the Q_{10} represents an arylene group or a bivalent heterocyclic group; the L_3 represents a linkage group; each of the W_1 and W_2 independently represents a hydrogen atom, an alkyl group, an aryl group or a heterocyclic group; and the n3 represents 0 or 1; and

in the Formula (J), the R_5 represents a monovalent substituent except a hydrogen atom; the m2 represents an integer of 1 to 6; and the $(R_5)_{m2}$ indicates that 1 to 6 R_5s are independently exist on a phthalazine ring.

8. The material of claim 7, wherein the compound is the compound represented by the Formula (1).

9. The material of claim 7, wherein the compound is the compound represented by the Formula (2).

10. The material of claim 7, wherein the compound is the compound represented by the Formula (3).

11. The material of claim 7, wherein the compound is the compound represented by the Formula (4).

12. The material of claim 7, wherein the compound is the compound represented by the Formula (A-8).

13. The material of claim 7, wherein the compound is the compound represented by the Formula (A-9).

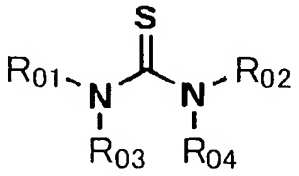
14. The material of claim 7, wherein the compound is the compound represented by the Formula (PO).

15. The material of claim 7, wherein the compound is the compound represented by the Formula (J).

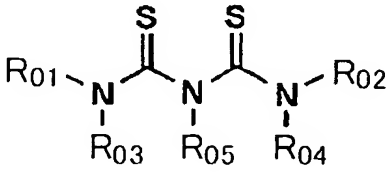
16. The material claim 7, wherein the photosensitive silver halide grains are chemically

sensitized.

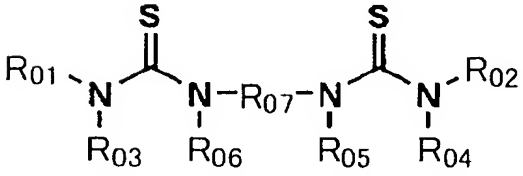
17. The material of claim 7, wherein chalcogen sensitization is performed to the photosensitive silver halide grains with at least one sulfur sensitizer represented by the following Formulas (5-1) to (5-3) or a sulfur sensitizer having a nucleus represented by the following Formula (5-4), (5-5) or (5-6),



···(5-1)

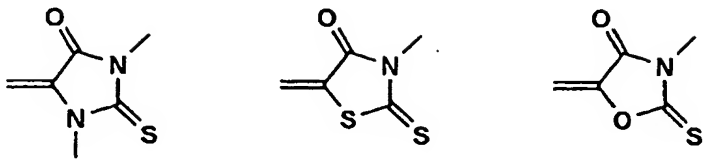


···(5-2)



···(5-3)

(5−4) (5−5) (5−6)

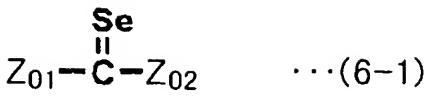


wherein in the Formula (5-1), each of the R_{01}, R_{02}, R_{03} and R_{04} independently represents a hydrogen atom, an alkyl group, an aryl group, a cycloalkyl group, an alkenyl group, an alkynyl group or a heterocyclic group;

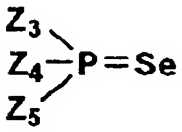
in the Formula (5-2), each of the R_{01}, R_{02}, R_{03}, R_{04} and R_{05} independently represents a hydrogen atom, an alkyl group, an aryl group, a cycloalkyl group, an alkenyl group, an alkynyl group or a heterocyclic group; and

in the Formula (5-3), each of the R_{01}, R_{02}, R_{03}, R_{04}, R_{05} and R_{06} independently represents a hydrogen atom, an alkyl group, an aryl group, a cycloalkyl group, an alkenyl group, an alkynyl group or a heterocyclic group; and the R_{07} represents a bivalent linkage group.

18. The material of claim 7, wherein chalcogen sensitization is performed to the photosensitive silver halide grains with at least one selenium sensitizer represented by the following Formulas (6-1) and (6-2),



$\cdots(6\text{-}1)$

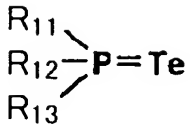


$\cdots(6\text{-}2)$

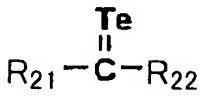
wherein in the Formula (6-1), each of the Z_{01} and Z_{02} represents an alkyl group, an alkenyl group, an aryl group, a heterocyclic group, an $-NA_1(A_2)$, an $-OA_3$ or an $-SA_4$, each of the A_1, A_2, A_3 and A_4 representing an alkyl group, an aryl group or a heterocyclic group; and

in the Formula (6-2), each of the Z_3, Z_4 and Z_5 represents an aliphatic group, an aromatic group, a heterocyclic group, an $-OA_7$, an $-NA_8(A_9)$, an $-SA_{10}$, a $-SeA_{11}$, a Y_2 or a hydrogen atom, each of the A_7, A_{10} and A_{11} representing an aliphatic group, an aromatic group, a heterocyclic group, a hydrogen atom or a cation, each of the A_8 and A_9 representing an aliphatic group, an aromatic group, a heterocyclic group or a hydrogen atom, and the Y_2 representing a halogen atom.

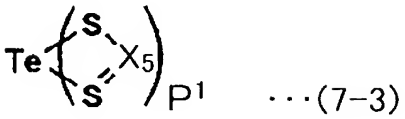
19. The material claim 7, wherein chalcogen sensitization is performed to the photosensitive silver halide grains with at least one tellurium sensitizer represented by the following Formulas (7-1) to (7-6),



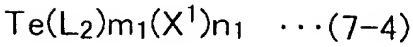
...(7-1)



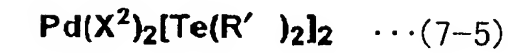
...(7-2)



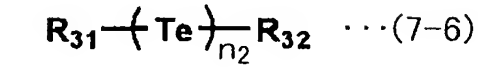
...(7-3)



...(7-4)



...(7-5)



...(7-6)

wherein in the Formula (7-1), each of the R_{11}, R_{12} and R_{13} represents a hydrogen atom, an aliphatic group, an aromatic group, a heterocyclic group, an OR_{14}, an $NR_{15}(R_{16})$, an SR_{17}, an $OSiR_{18}(R_{19})(R_{20})$ or an X_4, each of the R_{14} and R_{17} representing a hydrogen atom, an aliphatic group, an aromatic group, a heterocyclic group or a cation, each of the R_{15} and R_{16} representing a hydrogen atom, an aliphatic group, and aromatic group or a heterocyclic group, each of the R_{18}, R_{19} and R_{20} representing an aliphatic group, and the

X_4 representing a halogen atom;

in the Formula (7-2), the R_{21} represents an aliphatic group, an aromatic group, a heterocyclic group or an $-NR_{23}(R_{24})$ and the R_{22} represents an $-NR_{25}(R_{26})$, an $-N(R_{27})N(R_{28})R_{29}$ or an $-OR_{30}$, each of the R_{23}, R_{24}, R_{25}, R_{26}, R_{27}, R_{28}, R_{29} and R_{30} representing a hydrogen atom, an aliphatic group, an aromatic group, a heterocyclic group or an acyl group;

in the Formula (7-3), the X_5s represent the same or different COR, CSR, $CN(R)_2$, CR, $P(R)_2$ or $P(OR)_2$ groups (the R is an alkyl group with a carbon number of 1 to 20, an alkenyl group with a carbon number of 2 to 20, a carbocyclic or heterocyclic aryl group with a carbon number of 6 to 10 in a monocyclic system or a condensed cyclic system), each of the groups being bonded with two sulfur atoms via the carbon atom or the phosphorus atom in the groups; and the p1 is 2 or 4;

in the Formula (7-4), the L_2s represent the same or different ligands inducted from a neutral Lewis base; the X^1s represent the same of different halogen atoms, OCN, SCN, $S_2CN(R)_2$, S_2COR, $S_2CSRS_2P(OR)_2$, $S_2P(R)_2$, SeCN, TeCN, CN, SR, OR, N_3, alkyl groups, aryl groups or O_2CR groups (the R is an alkyl group with a carbon number of 1 to 20, an alkenyl group with a carbon number of 2 to 20, a carbocyclic or heterocyclic aryl group with a carbon number of 6 to 10 in a monocyclic system or a condensed cyclic system); the m1

is 0, 1, 2 or 4; the n1 is 2 or 4; when the m1 is 0 or 2, the n1 is 2 or 4, and when the m1 is 1 or 4, the n1 is 2;

in the Formula (7-5), the X^2 represents a halogen atom, OCN, SCN, $S_2CN(R)_2$, S_2COR, $S_2CSRS_2P(OR)_2$, $S_2P(R)_2$, SeCN, TeCN, CN, SR, OR, N_3, alkyl group, aryl group or O_2CR group, the R being an alkyl group with a carbon number of 1 to 20, an alkenyl group with a carbon number of 2 to 20, a carbocyclic or heterocyclic aryl group with a carbon number of 6 to 10 in a monocyclic system or a condensed cyclic system; and the R' represents an alkyl or aryl group; and

in the Formula (7-6), each of the R_{31} and R_{32} represents an aliphatic group, an aromatic group, a heterocyclic group or a $-(C=Y')R_{33}$; the R_{33} represents a hydrogen atom, an aliphatic group, an aromatic group, a heterocyclic group, an $NR_{34}(R_{35})$, an OR_{36} or an SR_{37}; the Y' represents an oxygen atom, a sulfur atom or an NR_{38}; each of the R_{34}, R_{35}, R_{36}, R_{37} and R_{38} represents a hydrogen atom, an aliphatic group, an aromatic group or a heterocyclic group; and the n2 represents 1 or 2.

20. The material of claim 7, wherein the photosensitive silver halide grains are chemically sensitized with a gold sensitizer represented by the following Formula (8),

$$Au(III)L'rY_3q \quad \cdots\cdot(8)$$

wherein the L' represents the same or different

ligands, each ligand including at least one hetero atom capable of forming a bond with gold; the Y_3 is an anion; the r is an integer of 1 to 8; and the q is an integer of 0 to 3.

21. The material of claim 1, wherein coefficient of determination R^2 of a linear regression straight line is 0.998 or more and 1.000 or less, the R^2 being made by measuring each density at optical density of 0.5, 1.0, 1.5 and minimum optical density on a silver image obtained after thermal development processing of the silver salt photothermographic dry imaging material and by disposing u* and v* at the above each optical density on two dimensional coordinates where a horizontal and vertical axes in CIE 1976 (L*u*v*) color space are made u* and v*, respectively; and v* value of an intersection point with the vertical axis of the linear regression straight line is -5 or more and 5 or less; and a slope (v*/u*) is 0.7 or more and 2.5 or less.

22. The material of claim 2, wherein coefficient of determination R^2 of a linear regression straight line is 0.998 or more and 1.000 or less, the R^2 being made by measuring each density at optical density of 0.5, 1.0, 1.5 and minimum optical density on a silver image obtained after thermal development processing of the silver salt

photothermographic dry imaging material and by disposing u* and v* at the above each optical density on two dimensional coordinates where a horizontal and vertical axes in CIE 1976 (L*u*v*) color space are made u* and v*, respectively; and v* value of an intersection point with the vertical axis of the linear regression straight line is -5 or more and 5 or less; and a slope (v*/u*) is 0.7 or more and 2.5 or less.

23. The material of claim 4, wherein coefficient of determination R^2 of a linear regression straight line is 0.998 or more and 1.000 or less, the R^2 being made by measuring each density at optical density of 0.5, 1.0, 1.5 and minimum optical density on a silver image obtained after thermal development processing of the silver salt photothermographic dry imaging material and by disposing u* and v* at the above each optical density on two dimensional coordinates where a horizontal and vertical axes in CIE 1976 (L*u*v*) color space are made u* and v*, respectively; and v* value of an intersection point with the vertical axis of the linear regression straight line is -5 or more and 5 or less; and a slope (v*/u*) is 0.7 or more and 2.5 or less.

24. The material of claim 7, wherein coefficient of determination R^2 of a linear regression straight line is

0.998 or more and 1.000 or less, the R^2 being made by measuring each density at optical density of 0.5, 1.0, 1.5 and minimum optical density on a silver image obtained after thermal development processing of the silver salt photothermographic dry imaging material and by disposing u* and v* at the above each optical density on two dimensional coordinates where a horizontal and vertical axes in CIE 1976 (L*u*v*) color space are made u* and v*, respectively; and v* value of an intersection point with the vertical axis of the linear regression straight line is -5 or more and 5 or less; and a slope (v*/u*) is 0.7 or more and 2.5 or less.

25. A method for recording an image on the material of claim 1, comprising:

performing image exposure according to a vertical multiple mode laser scanning exposure apparatus.

26. A method for recording an image on the material of claim 2, comprising:

performing image exposure according to a vertical multiple mode laser scanning exposure apparatus.

27. A method for recording an image on the material of claim 4, comprising:

performing image exposure according to a vertical

multiple mode laser scanning exposure apparatus.

28. A method for recording an image on the material of claim 7, comprising:

performing image exposure according to a vertical multiple mode laser scanning exposure apparatus.

29. A method for forming an image after performing image recording on the material of claim 1, comprising:

thermal developing in a state containing 40 to 4500 ppm of organic solvent.

30. A method for forming an image after performing image recording on the material of claim 2, comprising:

thermal developing in a state containing 40 to 4500 ppm of organic solvent.

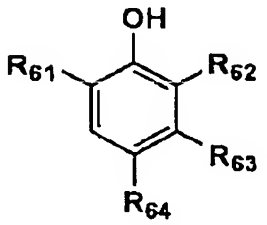
31. A method for forming an image after performing image recording on the material of claim 4, comprising:

thermal developing in a state containing 40 to 4500 ppm of organic solvent.

32. A method for forming an image after performing image recording on the material of claim 7, comprising:

thermal developing in a state containing 40 to 4500 ppm of organic solvent.

33. The material of claim 7, comprising a compound represented by the following Formula (A-6) in a side of a face having the photosensitive layer,



···(A-6)

wherein the R_{61} represents a substituted or non-substituted alkyl group; the R_{62} represents a hydrogen atom, a substituted or non-substituted alkyl group or a substituted or non-substituted acylamino group, the R_{61} and the R_{62} being substantially free from 2-hydroxyphenylmethyl group; the R_{63} represents a hydrogen atom or a substituted or non-substituted alkyl group; and the R_{64} represents a substituent capable of being substituted on a benzene ring.

34. The material of claim 7, wherein an average gradation is from 2.0 to 4.0 at an optical density of 0.25 to 2.5 in diffused light on a characteristic curve shown on rectangular coordinates where unit lengths of diffuse density (Y axis) and common logarithm exposure amount (X axis) are equal on an image obtained by thermally developing at a development temperature of 123°C for a

development time of 13.5 sec.

35. The material of claim 7, wherein a glass transition temperature Tg of the binder is from 70°C to 150°C.

36. The material of claim 7, comprising a compound represented by the following Formula (SF),

$$(Rf-(L_4)_{n4}-)_{p2}-(Y_3)_{m4}-(A)_{q1} \quad \cdots\cdot(SF)$$

wherein the Rf represents a substituent containing a fluorine atom; the L_4 represents a bivalent linkage group substantially free from a fluorine atom; the Y_3 represents a bivalent to quadrivalent linkage group substantially free from a fluorine atom; the A represents an anion group or a base thereof; each of the n4 and m4 represents an integer of 0 or 1; the p2 represents an integer of 1 to 3; the q1 represents an integer of 1 to 3; and when the q1 is 1, the n4 and m4 are not simultaneously 0.

37. The material of claim 7, comprising at least one silver saving agent selected from a vinyl compound, a hydrazine derivative, a silane compound and a quaternary onium salt in a side of a face having the photosensitive layer.

38. The material of claim 7, wherein the silver

halide grains are chemically sensitized with a chalcogen compound.

39. The material of claim 7, wherein an amount of silver contained in the photosensitive layer is from 0.3 to 1.5 g/m^2.